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EXAMINER

JEFFERY, JOHN A

ART UNIT

PAPER NUMBER

3742

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application N .

09/890,445

Applicant(s)

TUAN ET AL.

Examiner

John A. Jeffery

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7 and 14-17 is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-13 and 18-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5, 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Claim Objections***

Claims 13, 22, and 42-44 are objected to because of the following informalities:

Claims 13 and 22: In line 1, "alternate" must be changed to "alternating."

Claim 42: In line 4, "to" must be inserted after "directed."

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this action:

A person shall be entitled to a patent unless -

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-4 are rejected under 35 USC 102(b) as being anticipated by Xie et al (US5447564). Xie et al (US5447564) discloses an electrically conductive concrete mixture comprising cement, aggregates (fine and coarse), water, and conductive materials comprising both metallic fibers (col. 5, line 67 – col. 8, line 13) and metallic particles (col. 6, lines 14-22). The metallic fibers are present in the amount of 0-15% by volume and the metallic particles are present in the amount from 0-80% by volume (i.e., anticipating the claimed fiber and particle ranges in claims 2-4). See abstract. Also, the limitation in the preamble of claim 1 that the mixture is "for use in a bridge deck system" merely recites the intended use of the mixture and does not further limit the claim

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structurally. It is well settled that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). Also, a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus satisfying the structural limitations of the apparatus claimed. See *Ex parte Masham*, 2 USPQ 2d 1647 (1987). Here, there is no reason why the conductive concrete disclosed by Xie et al (US5447564) is not capable of being used in a bridge deck—particularly in view of the diverse civil engineering structural applications envisioned by Xie et al (US5447564) in col. 1, lines 20-27.

Claims 8, 9, and 27-44 are rejected under 35 USC 102(a) as being anticipated by the article by Yehia and Tuan from Crossroads 2000 (Iowa State Univ.) entitled “Bridge Deck Deicing” (hereinafter “Yehia & Tuan”). Yehia & Tuan discloses a bridge deck heating system using conductive concrete with metal fibers and particles therein. See abstract. A photovoltaic system can be used in conjunction with a battery power system. See P. 56. For grid connected systems, inverters can be employed to convert DC to AC. *Id.* With regard to claim 27, note intervening thermal insulation layer between conductive concrete layer and the bridge deck. Regarding claim 38, note Pages 56-57 discussing the use of RF power sources and microwave heating.

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Although Yehia & Tuan constitutes the work of two named Applicants of the instant application (Yehia and Tuan), the reference nevertheless qualifies as 102(a) prior art in view of the different inventive entity named in the instant application as compared to the reference (i.e., reference was published to "another" before the instant application's effective U.S. filing date).

***Joint Inventors--Common Ownership Presumed***

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103, the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligations under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Subject matter developed by another person, which qualifies as prior art only under subsection (f) and (g) of section 102 of this title, shall not preclude patentability under this section where the subject matter and the

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claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.

***Claim Rejections - 35 USC § 102 or 103(a)***

Claim 45 is rejected under 35 U.S.C. 102(b) as being anticipated by Rau (US1473047) or, in the alternative, under 35 U.S.C. 103(a) as being obvious over Rau (US1473047). Rau (US1473047) discloses an insulating material comprising 60% plaster Paris (mortar) and 7% sawdust. Although Rau does not expressly state the percentages are by volume, such relative volume percentages would be inherent to Rau. If such inherency is disputed, then it would have been obvious to one of ordinary skill in the art to interpret the percentages recited by Rau as volume percentages, particularly in view of the relative densities of the mortar as compared to sawdust, as well as the relatively stable volumes of the respective materials at differing temperatures.

Claims 5 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xie et al (US5447564) in view of CA836117. The claims differ from the previously cited prior art in calling for embedding electrodes at spaced locations. Although Xie et al (US5447564) is silent regarding embedding electrodes to apply electric power to the concrete, embedding electrodes in conductive concrete to apply electric power thereto for heating purposes is conventional and well known in the art as evidenced by CA836117 noting Page 1, line 24 – Page 2, line 2. In view of CA836117, it would have been obvious to one of ordinary skill in the art to embed electrodes in the concrete in

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the previously described apparatus so that the electrodes were not present on the surface of the concrete thereby ensuring a smooth surface thus protecting the electrodes as well as the electrodes functioning as ancillary concrete reinforcement. With regard to claim 18, note the language of claim 1 on Page 7 that teaches the conductive concrete electric heater is a "coating covering [a] foundation layer." See also Page 2, lines 19-27.

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Yehia & Tuan. The claim differs from Yehia & Tuan in calling for a step-up transformer. However, according to P. 56, Yehia & Tuan teaches that AC power "can be transformed to the required voltage and current depending on the resistance of the specimens." Step-up transformers are well known in the art to increase voltage. Thus, the use of a step-up transformer to transform the voltage to a desired higher level would have been within the level of one of ordinary skill in the art in order to increase the applied voltage to the heater from a given power supply thereby increasing the heating effect.

Claims 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over CA836117 in view of Xie et al (US5447564) and further in view of the article by Milo D. Cress entitled "Heated Bridge Deck Construction and Operation in Lincoln, Nebraska" (hereafter "the Cress article"), or, alternatively, Yehia & Tuan in view of the Cress article. The claims differ from the previously cited prior art in calling for both temperature and moisture sensors coupled to a controller to turn the heater on or off

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responsive to sensed temperature and moisture levels. the Cress article discloses on Page 450 using a "snow sensing system" including temperature and moisture sensors in conjunction with a bridge deck heating system. Moreover, on Page 452, the Cress article teaches that the moisture and temperature sensors provide control signals to turn on the heater responsive to predetermined moisture and temperature conditions. In view of the Cress article, it would have been obvious to one of ordinary skill in the art to provide a control system for the heated concrete structure of the previously described apparatus so that the heater was energized responsive to sensed moisture and temperature conditions (e.g., snow, ice, etc.) thereby energizing the heater only when needed thus saving energy and prolonging the life of the heater.

Claims 6, 19, 20, 22, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xie et al (US5447564) in view of CA836117 and further in view of Minsk (US3573427). The claims differ from the previously cited prior art in calling for the electrodes to be spaced 5-6 feet apart. While CA836117 does not disclose the exact electrode spacing, the selection of electrode spacing to achieve a desired heating effect is an engineering design choice given a desired heating effect and within the level of one of ordinary skill in the art. Because the conductive concrete has a certain electrical resistance per unit length, the spacing of the electrodes necessarily dictates the resulting electrical resistance of the conductive concrete structure, thereby establishing a certain amount of electric heating depending on the applied voltage. Therefore, the choice of electrode spacing to achieve a desired amount of ohmic

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heating of the concrete structure would have been within the level of one of ordinary skill in the art – an electrical engineer with at least five years of related industry experience. Moreover, Minsk (US3573427) teaches in col. 3, lines 50-55 that a spacing of five feet is preferable for a desired voltage gradient. However, Minsk (US3573427) teaches that other spacings are possible spanning from 3-15 feet. Therefore, in view of Minsk (US3573427), it would have been obvious to one of ordinary skill in the art to select a five foot spacing so that a desired heating effect was achieved. The claims also differ from the previously cited prior art in calling for a power source capable of heating the layer to a temperature greater than 0 degrees C. Energizing electrically conductive concrete to prevent snow and ice accumulation thereon is conventional and well known in the art as evidenced by Minsk (US3573427) noting the abstract. Because ice and snow is prevented from accumulating on the concrete, its temperature is above freezing (i.e., above 0 deg. C). Regarding claim 20, according to col. 3, lines 5-7, the upper limit of the power dissipation is 40 Watts per square foot (444.4 watts per square meter). Although this power dissipation is outside of the claimed 500-600 watts per sq. meter range, no criticality is seen in the power dissipation being within the claimed range, particularly given the commensurate objectives of both the prior art conductive concrete and the instant invention – namely preventing the accumulation of ice and snow thereon.

Claims 21, 23, 24, and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Xie et al (US5447564) in view of CA836117, Minsk (US3573427),

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and further in view of Yehia & Tuan. The claims differ from the previously cited prior art in calling for a DC power source and a photovoltaic power system. Yehia & Tuan disclose a bridge deck heating system using conductive concrete with a photovoltaic system used in conjunction with a battery power system. See P. 56. In view of Yehia & Tuan, it would have been obvious to one of ordinary skill in the art to use DC power sources and a photovoltaic system in order to be able to electrically power the heater in remote locations away from mains power as well as have the ability to recharge the battery via solar radiation.

***Allowable Subject Matter***

Claims 7 and 14-17 are allowable over the art of record.

***Other Pertinent Prior Art***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The art should be both separately considered and considered in conjunction with the previously cited prior art when responding to this action. The Maggenti article, FR 485, CN 261, JP 865, JP 727, JP 687, DE 233. the Gabbitas article, the Concrete Construction article, the Senta article, DD 276 disclose electrically heated pavement relevant to the instant invention. US 600, US 547, JP 347, US 518, JP 637 disclose electrically conductive concrete compositions relevant to the instant invention.

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***Conclusion***

Any inquiry concerning this or earlier communications from the examiner should be directed to John A. Jeffery at telephone number (703) 306-4601 or fax (703) 305-3463. The examiner can normally be reached on Monday-Thursday from 7:00 AM to 4:30 PM EST. The examiner can also be reached on alternate Fridays.

The fax phone numbers for the organization where this application or proceeding is assigned are:

Before Final	(703) 872-9302
After Final	(703) 872-9303
Customer Service	(703) 872-9301

Any inquiry of a general nature or relating to the status of this application should be directed to the Technology Center receptionist whose telephone number is (703) 308-0861.



**JOHN A. JEFFERY  
PRIMARY EXAMINER**

**5/27/03**